Remarks/Arguments

These remarks are in response to the Final Office Action dated September 9, 2004. This reply is timely filed.

At the time of the Final Office Action, claim 1 was cancelled. Claims 2-18 were pending in the application. Claims 2, 5-10 and 13-18 were rejected under 35 U.S.C. §103(a). The rejections are set out in more detail below.

I. Brief Review of Applicants' Invention

Applicants' invention relates to a distributed messaging system for transmitting topical messages from data publishers to data consumers. In the distributed messaging system, interprocess communications between data publishers and data consumers can be re-synchronized in the event that data communications between such entities are lost. The architecture of the messaging system includes a message topic server, a plurality of message routers, and a plurality of message adapters distributed across several computing devices in a computer communications network. The message adapters are communicatively linked to applications, each of which can be a data consumer or a data publisher executing in a computing device. The data consumers consume and process data messages published by data publishers.

The data publishers can be communicatively linked to corresponding message adapters executing in the same computing device. Similarly, data consumers can be linked to message adapters executing in the same computing device. Further, each message adapter can be linked to a message router, also executing in the same computing device. Finally, each message router can be communicatively linked to a

message topic server, although the message topic server typically executes in another computing device.

The message topic server can contain a list of message topics to which data consumers can subscribe. In addition, the message topic server also can keep a list of data publishers which publish data messages consonant with the message topics. After registering a message topic, a data publisher can provide correlating data messages to those data consumers which choose to subscribe to the message topic.

Through its associated message router, a data consumer can subscribe to a message topic which has been published by a data publisher. The message topic server can respond to such a subscription request by transmitting to the associated message router a host identification of a second message router from which the requesting data consumer can receive the data messages to which it has subscribed. Notably, an interprocess communications link then can be established between the message router that is associated with the data consumer and the second message router. Messages consonant with the requested message topic then can be transmitted over the interprocess communications link.

Notably, the distributed messaging system of the present invention can utilize a shared state memory which stores both message traffic and network configuration data. More particularly, the three network components (message adaptor, message router and message topic server) can form the shared state memory. In consequence, the message traffic and network configuration data is readily available for reconstruction and re-synchronization of interprocess communications should the distributed messaging system experience a communications fault with any combination of the three

network components. Moreover, by virtue of the shared state memory architecture of the present invention, recovery and re-synchronization processes can be implemented without loss of data.

II. Claim Rejections on Art

Claims 2, 5-10 and 13-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,298,455 to Knapman, et al. ("Knapman") in view of U.S. Patent No. 6,070,191 to Narendran, et al. ("Narendran"), and in further view of U.S. Patent No. 6,400,681 to Bertin et al. (Bertin). Claims 3-4 and 11-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Knapman in view Narendran and in further view of U.S. Patent No. 6,507,863 to Novaes ("Novaes").

a. Brief Review of Cited Art

Knapman discloses a technique for carrying out "failover." In failover, should a first distribution agent fail, other distribution agents which communicate directly with the first distribution agent will transfer their subscriptions to a second distribution agent which is a sibling of the first distribution agent. Knapman implements failover by providing a data processing broker network having a plurality of broker data processing apparatuses. Each of the apparatuses is configured to assign a broker-specific sequence number to a received message. A first of the broker apparatuses has a software unit for determining a failure of a neighboring broker apparatus which has provided published messages on a first topic. The first broker apparatus also includes a software unit for sending historic resubscriptions with respect to the first topic to each antecedent broker apparatus of the failed neighboring broker apparatus. The historic

resubscriptions are sent using the broker-specific sequence number corresponding to each antecedent broker apparatus.

Nerendran discloses a server system for processing client requests received over the Internet. The server system includes a cluster of N document servers and at least one redirection server. The redirection server receives a client request from the network and redirects it to one of the document servers, based on a set of pre-computed redirection probabilities. Each of the document servers may be an HTTP server that manages a set of documents locally and can service client requests only for the locally-available documents. A load distribution algorithm is used to distribute a set of documents across the document servers. In the event of a server failure, the redirection probabilities are recomputed and a URL of a new server is provided to clients requesting documents contained on the failed server.

Bertin is directed to a high speed packet switching network and, in particular, to a method and system for minimizing the time to establish a connection between an origin and a destination node. For each connection request, a pre-calculated path satisfying the connection request is selected from a routing database. If a pre-calculated path satisfying the connection is not already stored in the routing database, a path satisfying the connection request is calculated and stored in the routing database. Further, Bertin discloses periodically re-calculating the paths stored in the routing database, and calculating an alternate path for each stored path having a same origin and destination node. Finally, pre-calculated paths are removed from the routing database after a period of time passes without the paths being selected.

b. Claim Rejections

Claims 2, 10 and 18 each recite establishing interprocess communications between first and second routers. Interprocess communications allow one process to directly communicate with another process at runtime, for example using pipe (a pipe is a pair of files that connect resulting processes when a parent file forks). Using interprocess communications, data latency is minimized. Knapman, Narendran and Bertin each fail to disclose any such interprocess communications. In particular, each of the cited references concern passing of data from servers to clients (or users). Such data passing is not interprocess communication, however. In contrast to data passed through interprocess communications, data passed from servers to clients passes through multiple communication and application layers, and thus the processes are not directly connected. Moreover, in comparison to data passed via interprocess communications, data passed from servers to clients typically is subject to significantly higher data latency.

Claims 2, 10 and 18 each also recite sharing state memory among at least a message topic server, a first message router and a second message router to store both message traffic and network configuration data. Responsive to a communication fault in the first message router, the second message router, the data consumer or the message server, the interprocess communications connection is re-synchronized from said shared state memory, which provides network configuration data and network traffic data. Importantly, the re-synchronization process can be implemented without loss of data.

PAGE 12/16 * RCVD AT 12/1/2004 2:00:20 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/5 * DNIS:8729306 * CSID:5616262681 * DURATION (mm-ss):04-30

In rejecting claims 2, 10 and 18, the Examiner concedes that Knapman does not disclose a redirection mechanism. The Examiner also concedes that neither Knapman nor Narendran teach or suggest sharing state memory among at least a message topic server and first and second message routers to store both message traffic and network configuration data. Notwithstanding, the Examiner does assert that Bertin discloses state memory to store both message traffic data and network configuration data. Specifically, the Examiner cites the first paragraph of the Summary of the Invention (Col. 5, lines 46-60) in which Bertin discloses that each node of a network comprises a Topology Database for storing the network configuration and traffic characteristics, and a Routing Database for storing selected or computed paths.

In contrast to the claimed invention, however, Bertin does not disclose re-synchronizing an interprocess communication connection from shared memory. Instead, Bertin uses the Topology Database and Routing Database to determine an alternative path for a new connection. Col. 5, lines 30-44, Col. 22, lines 61-65. Bertin does disclose that the new connection is established as fast as possible, however, data packets still may be lost due to the route change. In contrast, the original communication connection is not lost in the claimed invention, only re-synchronized. Accordingly, the present invention prevents data loss.

Further, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so. MPEP § 2143.01. "Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat

patentability—the essence of hindsight." In Re Dembiszak and Zinbarg, 175 F.3d 994, 50 U.S.P.Q.2D 1614 (Fed. Cir. 1999). The Examiner has provided no such teaching, suggestion, or motivation to combine the respective references, and the references themselves fail to do so.

Specifically, the claimed invention re-synchronizes an interprocess commutation connection in response to a communication fault. None of the cited references suggest that such re-synchronization is even desirable. Instead, Knapman teaches that in response to a failure of broker N, a broker B which previously subscribed to broker N will perform a historic re-subscription to other brokers. Col. 6, lines 10-14. There is no suggestion of any benefit from re-synchronizing broker B to broker N.

Similarly, Bertin teaches that is desirable to calculate a new routing path at the time a connection is requested (Abstract), but again there is no indication that it is desirable to re-synchronize with the original traffic data. Instead, Bertin teaches that it is desirable to compute new communication routes.

Finally, Narendran teaches redirecting client requests to one of a plurality of document servers, based on a set of pre-computed redirection probabilities. (Abstract). When a given document server fails, a network flow algorithm is used to recompute the redirection probablilities in order to rebalance the load across the remaining document severs. Col. 6, lines 36-40. Thus, rather than attempting to re-synchronize a connection between two routers, Narendran teaches that client requests should be sent to a new server which is randomly selected based on probabilities. Such teachings are contrary to the problem solved by the present invention, which establishes re-synchronization between specific routers.

Since none of the cited reference provide a teaching, suggestion, or motivation to combine to solve the problem solved by the present invention, combination of the references is improper use of Hindsight. Accordingly, the asserted combination of references cannot sustain an obviousness rejection of claims in the present application.

Claims 5 and 13 recite establishing an interprocess communications connection in response to detecting an interruption. The interprocess communications connection is established between the first message router and the message router communicatively linked to a data publisher able to resume providing the data messages. Neither Knapman nor Narendran teach or suggest this limitation. Instead, after a broker failure, Knapman performs historic resubscriptions, which do not include establishing an interprocess communications connection. As noted, rather than establishing an interprocess communications connection when a server is down, Narendran merely provides a URL for an alternate server which can be accessed to obtain documents. Similarly, instead of establishing an interprocess communications connection in response to an interruption, Bertin re-calculates network paths stored in a routing database. Col. 6, lines 5-9. Such network paths are not interprocess communications links, but instead are packet communication links. Col. 8, lines 48-55.

IV. Conclusion

Applicants have made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. Nevertheless, Applicants invite the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicants respectfully requests reconsideration and prompt allowance of the pending claims.

No fee is believed to be due under this Amendment. However, please charge any deficiencies of credit any overpayment to Deposit Account No. 50-2884.

Respectfully submitted,

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